



Practical First Steps to Procuring Renewable Electricity

ENERGY STAR
Quarterly Industrial Brownbag Series
Thursday, November 19, 2020
Noon (Eastern)

Trouble with audio: email
estraining@icfi.com



Deadline Reminders

**ENERGY STAR
Industrial Plant
Certification**
November 30



**Partner of the Year
Application**
*December 9, 8 PM
ET*



Presenters



James Critchfield
Program Manager,
Green Power Partnership
***U.S. Environmental
Protection Agency***



Andy Smith
Senior Manager, Global Energy
Management and Sustainability
Cisco



Buying Green Power

For the Manufacturing and Industrial Sector

November 19, 2020

What is Green Power?

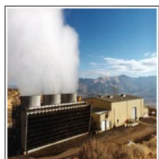


Wind

Solar



Geothermal



Biomass



Biogas



Low-Impact
Hydropower



- **Green power** is a subset of renewable electricity and represents those renewable energy resources and technologies that provide the highest environmental benefit.
 - Meets national standards for product quality and content
 - Green Power is specific to the “voluntary market” and is driven by consumer preference rather than by policy mandate
 - Is generation that is incremental to what is required by mandate

How EE & Green Power Work Together

$$\text{Energy (kWh)} \cdot \text{Emissions Rate} \left(\frac{\text{lbs CO}_2}{\text{kWh}} \right) = \text{Air Emissions}$$

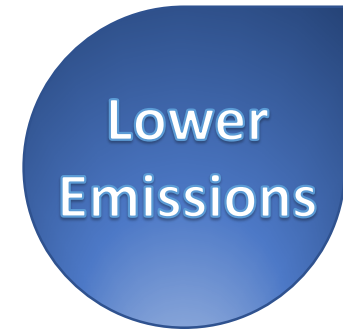
Energy Efficiency



Green Power Use



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Making a Difference

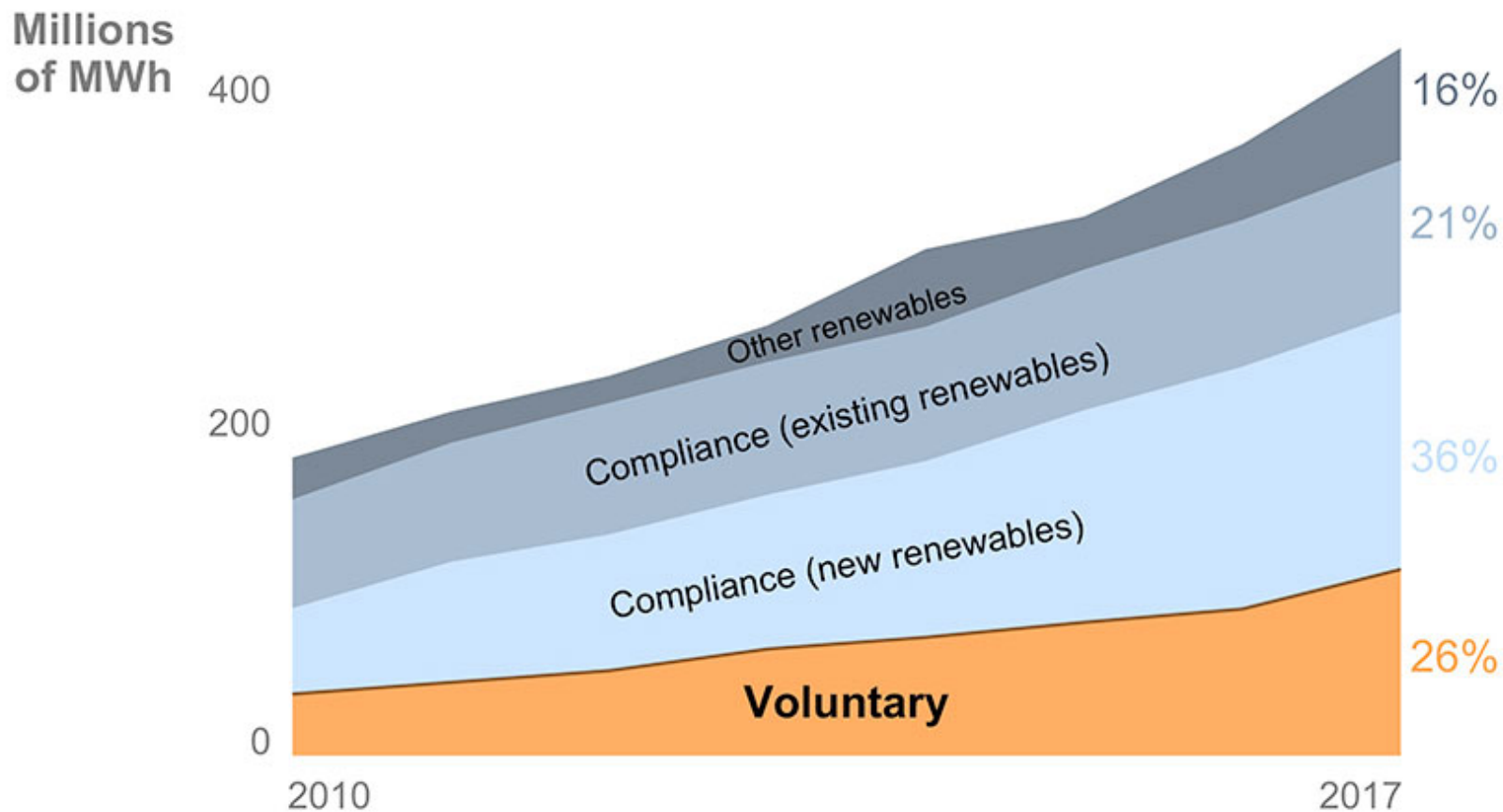
- Making the simple choice for how your power is generated
- Ensuring your purchase goes above and beyond what is otherwise available or mandated (incremental or surplus)
- Buy third-party certified green power when possible
- Commit to long-term contracts
- Directly engage with new projects (economic benefits)
- Substantiate your use and claims through REC ownership

Renewable Energy Certificates (RECs)

You are	only using
RENEWABLE	ELECTRICITY
when you	have both a
REC and	ELECTRICITY

National Voluntary Markets

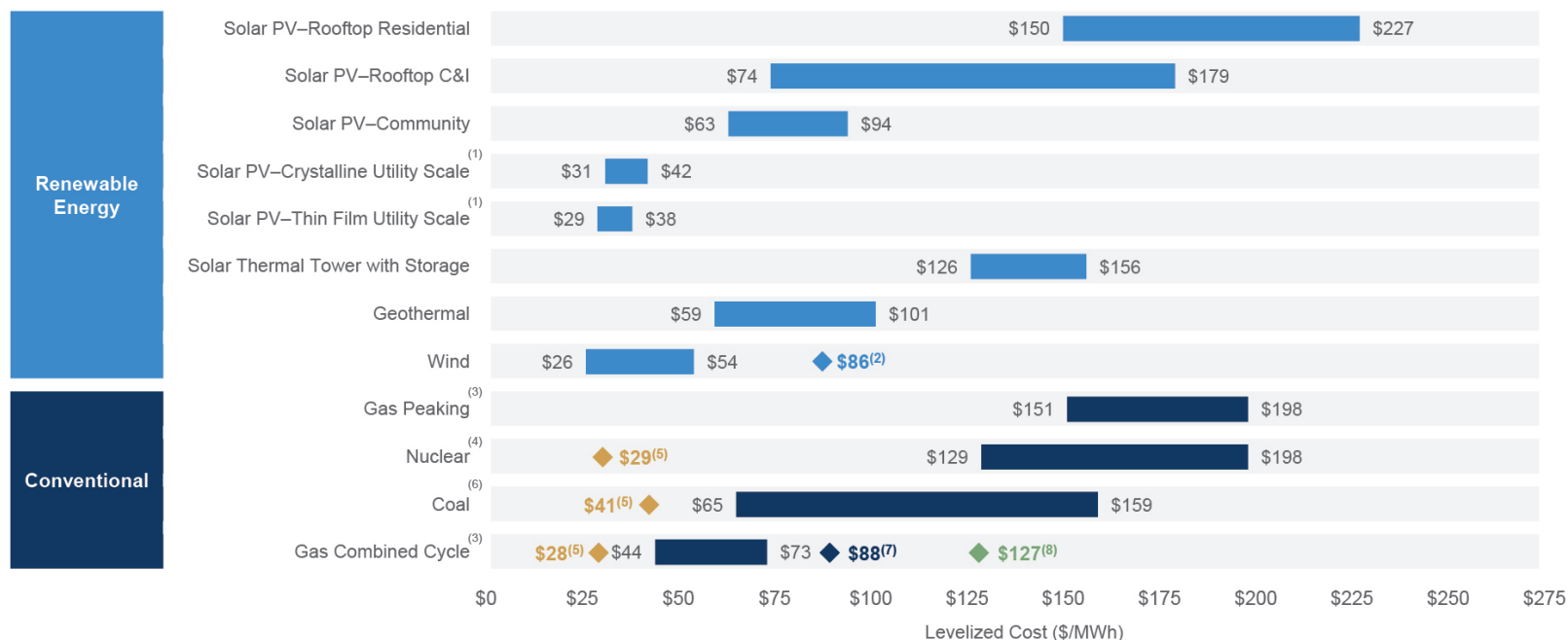
Voluntary Green Power Use Is An Important Market Driver



Levelized Cost of Electricity

Levelized Cost of Energy Comparison—Unsubsidized Analysis

Selected renewable energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances



Source: Lazard estimates.

Note: Here and throughout this presentation, unless otherwise indicated, the analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost. Please see page titled "Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital" for cost of capital sensitivities. These results are not intended to represent any particular geography. Please see page titled "Solar PV versus Gas Peaking and Wind versus CCGT—Global Markets" for regional sensitivities to selected technologies.

- (1) Unless otherwise indicated herein, the low case represents a single-axis tracking system and the high case represents a fixed-tilt system.
- (2) Represents the estimated implied midpoint of the LCOE of offshore wind, assuming a capital cost range of approximately \$2,600 – \$3,675/kW.
- (3) The fuel cost assumption for Lazard's global, unsubsidized analysis for gas-fired generation resources is \$3.45/MMBTU.
- (4) Unless otherwise indicated, the analysis herein does not reflect decommissioning costs, ongoing maintenance-related capital expenditures or the potential economic impacts of federal loan guarantees or other subsidies.
- (5) Represents the midpoint of the marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned gas combined cycle or coal asset is equivalent to its decommissioning and site restoration costs. Inputs are derived from a benchmark of operating gas combined cycle, coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper- and lower-quartile estimates derived from Lazard's research. Please see page titled "Levelized Cost of Energy Comparison—Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation" for additional details.
- (6) High end incorporates 90% carbon capture and storage. Does not include cost of transportation and storage.
- (7) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Blue" hydrogen, (i.e., hydrogen produced from a steam-methane reformer, using natural gas as a feedstock, and sequestering the resulting CO₂ in a nearby saline aquifer). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is \$5.20/MMBTU.
- (8) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Green" hydrogen, (i.e., hydrogen produced from an electrolyzer powered by a mix of wind and solar generation and stored in a nearby salt cavern). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is \$10.05/MMBTU.

EPA's Green Power Partnership

EPA's Green Power Partnership is a free, voluntary program that encourages organizations to use green power to reduce the environmental impacts associated with conventional electricity use

<https://www.epa.gov/greenpower>

Partners include:

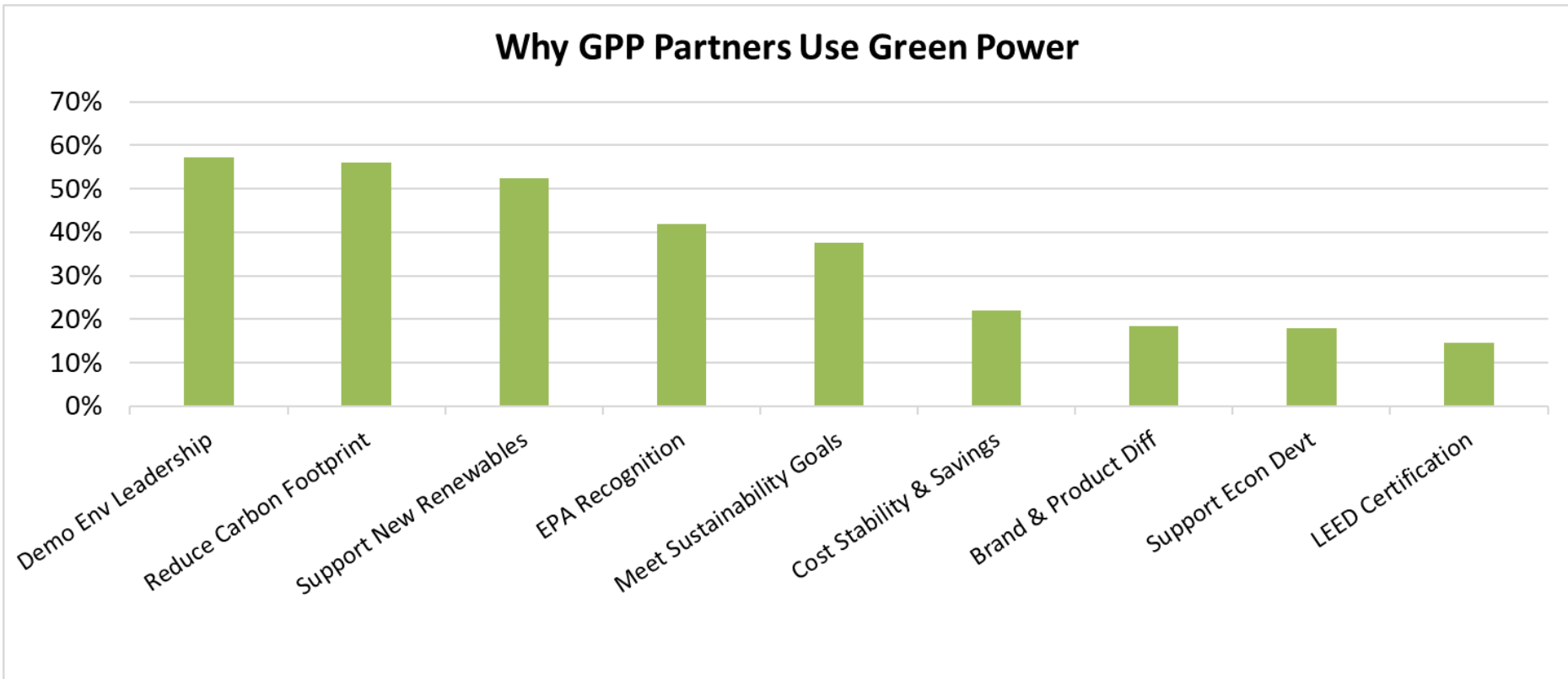
- Fortune 500 corporations
- Higher Education institutions
- Federal, State and local governments
- Small & medium sized businesses
- Non-profits

EPA Green Power Partners



Motivation

Why GPP Partners Use Green Power



Green Power Use Benchmarks

Annual electricity usage	Partnership minimum requirements
<i>If your annual electricity use in kilowatt-hours is ...</i>	<i>You must, at a minimum, use this much green power*:</i>
≥ 100,000,001 kWh	7% of use
10,000,001 – 100,000,000 kWh	10% of use
1,000,001 – 10,000,000 kWh	25% of use
100,000 – 1,000,000 kWh	50% of use

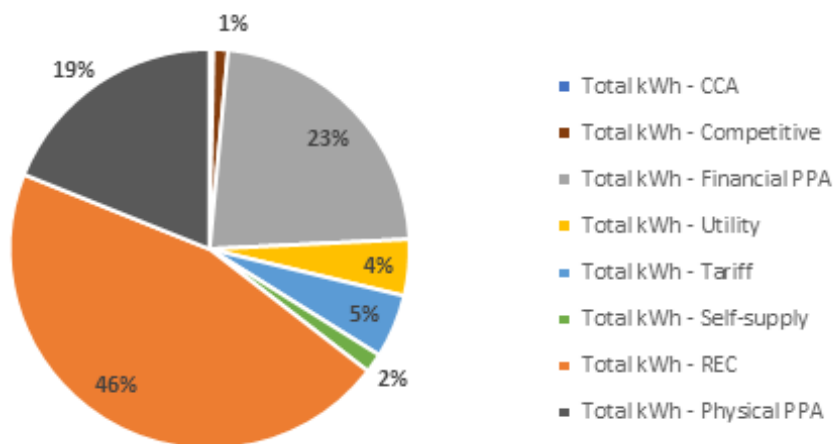
*All green power must be surplus to regulation or what is otherwise available to all ratepayers as part of the grid mix

EPA Green Power Partnership Program Requirements: <https://www.epa.gov/greenpower/requirements-green-power-partnership>

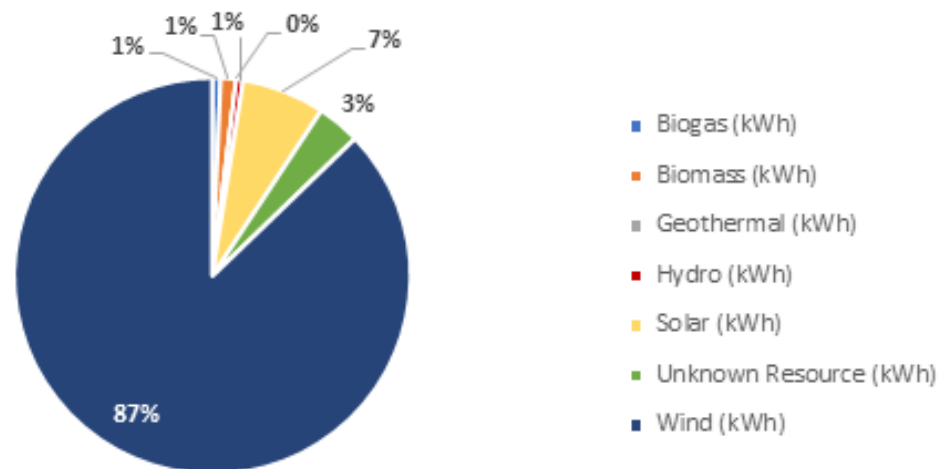
GPP: Manufacturing & Industrial Sector

- Number of Partners: 104
- Total Green Power: nearly 32.2 Billion kWh
- Average Green Power Use: more than 309 million kWh
- Equivalent No. of Homes: more than 2.9 million

Share of Green Power Use by Supply Option



Share of Green Power Use by Resource Type



Green Power Supply Options

Retail Options	Retail (Unbundled) RECs
	Utility Products or Programs
	Community Choice Aggregation
Project Specific Options	Self-Supply
	Physical PPAs
	Shared Renewables
	Utility Green Tariffs
	Financial Contracts

Green Power Supply Options

**Will Cost
You More**



Retail Options	Retail (Unbundled) RECs
	Utility Products or Programs

Your Current Electricity Cost

**May Save
You Money**



Retail Options	Community Choice Aggregation
Project Specific Options	Self-Supply
	Physical PPAs
	Shared Renewables
	Utility Green Tariffs
	Financial Contracts

Supply Option Summary

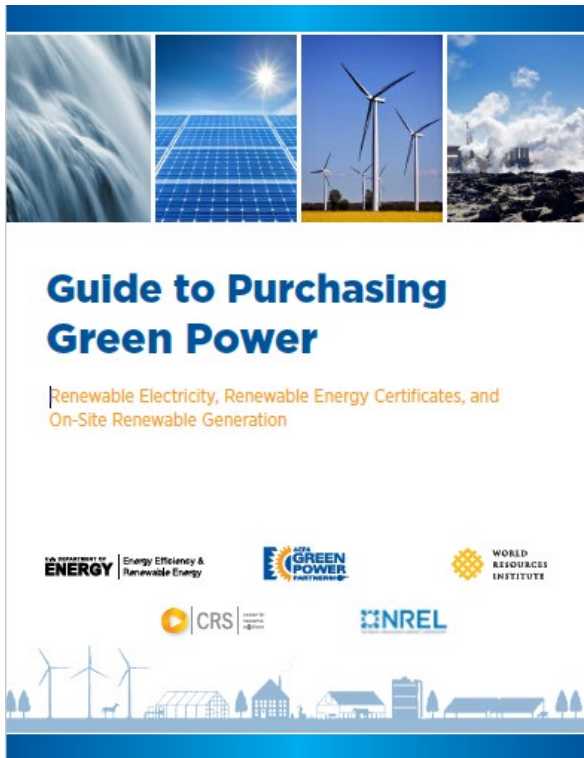
Supply Option	Unbundled REC Products	Utility Supply Options	Community Choice Aggregation	Physical Power Purchase Agreements	Financial PPAs / Contract for Differences	On-site Self Generation	Off-site Self Generation
Upfront Capital Investment	None	None	None	None	None	\$\$-\$\$\$	\$\$-\$\$\$\$
Ongoing Expenditures Relative to Incumbent Electricity Option	Cost premium	Cost premium; tariff may offer savings	Varies	Cost savings over life of contract	Cost savings over life of contract	Cost savings over life of project	Cost savings over life of project
Term of Commitment	Varies; significant flexibility	Monthly; multiyear for green tariff	Consumer opt-out provision	Multiyear	Multiyear	Operational life of installed technology	Operational life of installed technology
Transaction Complexity	+	+	+	+++	+++++	+++	++++
Transaction Includes	RECs only	RECs + Electricity	RECs + Electricity	RECs + Electricity delivery + fixed cost of electricity	RECs + Hedge against downside price risk	RECs* + Electricity + Generator	RECs* + Generator + Revenue from electricity sales

*Many smaller renewable energy projects are not formally issued RECs from regional tracking systems, but nonetheless still generate environmental attributes.

Practical First Steps...

- Know what you want as an outcome
- Collect relevant information (i.e., facility, market, policy information and annual electricity use data)
- Identify accessible supply options that fit your situation and objectives
- Get involved in industry groups
- Develop a green power procurement plan
- Solicit green power procurement bids
- Evaluate your procurement bids
- Sign a contract / build a project

Resources: Getting Started



- Guide To Purchasing Green Power
 - Great place to start if you have never purchased green power before
 - Authors include EPA, DOE, World Resources Institute, Center for Resource Solutions and NREL
 - <https://www.epa.gov/greenpower/guide-purchasing-green-power>

Toolbox for RE Project Development

- The “Toolbox” provides a wide range of resources on various steps, topics and issues related to project development supply options
 - Project development process
 - Policy considerations
 - Financing approaches
 - Project economics and evaluation
 - RFP and contracts guidance
 - Consumer claims guidance
- Toolbox: <https://www.epa.gov/repowertoolbox>
- Searchable Resource Directory:
<https://www.epa.gov/repowertoolbox/renewable-energy-project-development-resource-directory>

Questions?

James Critchfield

critchfield.james@epa.gov

202-343-9442

<https://www.epa.gov/greenpower>